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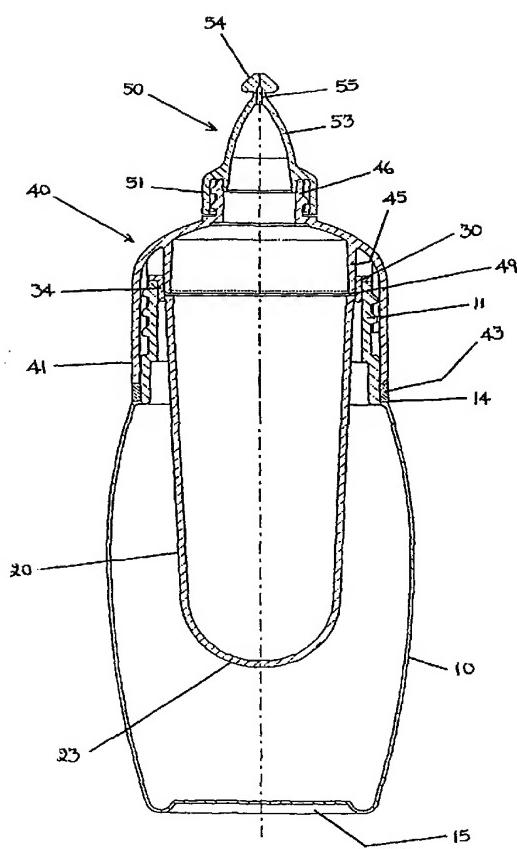
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(54) Title: CONTAINER FOR MIXING TWO COMPONENTS





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## CONTAINER FOR MIXING TWO COMPONENTS

The present invention relates to containers for storing and transporting materials and, in particular, to a twin-chamber container for separately storing and transporting two different materials intended to be mixed immediately prior to being dispensed. Most particularly, the container is intended to be used in the cosmetics industry for storing and transporting a two-component hair colourant preparation in which the active constituents must be constrained in separate containers until just prior to use.

Two-component hair colourant preparations are known and are usually marketed in two separate bottles enclosed within a single pack, usually of cardboard or the like.

One of the disadvantages of these known two-component hair colourant preparations is that the contents of one of the bottles must be decanted into the other bottle just prior to use. This can be a messy operation and is inconvenient for the user. Moreover, one of the bottles must be sufficiently over-sized to accommodate the contents of the other bottle to enable the two components to be mixed. This means that the pack includes a "dead" volume which must be accommodated on shelf space assigned to the product packs by the

retailer.

It is therefore an object of the present invention to provide a container which overcomes the problem of decanting the contents of one bottle into another to effect mixing. It is a further object of the invention to minimise dead volume in the container, thereby enabling higher pack densities to be achieved on the retailer's shelves. Minimisation of dead volume is also an advantage from the point of view of long-term storage and the costs of transportation.

The invention is a twin-chamber container comprising an outer bottle, a collar receivable in the mouth of said outer bottle, an inner bottle receivable in the mouth of said collar, and a sealing cap operable between a sealed condition in which it prevents escape of the contents of said outer and inner bottles, a mixing condition in which mixing between the contents from the outer and inner bottles is permitted and an open condition in which the mixed contents from the inner and outer bottles can be dispensed; characterised in that said sealing cap includes means for releasing said inner bottle from said collar into the volume defined by said outer bottle whilst maintaining fluid tightness of the container so as to achieve said mixing condition, thereby permitting the contents of said outer and inner bottles to be mixed prior to being dispensed.

Preferably, the collar is an interference fit in the mouth of the outer bottle and the inner bottle is an interference fit in the mouth of the collar.

Preferably, the outer bottle includes external screw threads around the outside of a neck portion thereof, and the sealing cap includes complementary internal screw threads around the inner periphery of a skirt portion thereof. Preferably, a tear band is provided adjacent the lower periphery of the depending skirt portion of the sealing cap. The tear band has a dual purpose of inhibiting movement of the sealing cap in such a way that would deploy the means for releasing the inner bottle from the collar and also of indicating on-shelf tampering.

Preferably, the means for releasing the inner bottle from its interference fit with the mouth of the collar comprises a plug seal depending from the underside of the sealing cap.

Preferably, the sealing cap includes an applicator nozzle for delivering the contents of the container, once mixed, to the intended site of application. The sealing cap may include a separate top cap attached to the sealing cap by means of a releasable connection such as complementary screw threads. The sealing cap, or the top

cap if one is provided, may include a frangible tip portion which can be removed by manipulation to expose a fluid passage which may act as a spout for delivering the contents of the container, once mixed, to the intended site of application.

The invention will now be described by way of example only with reference to the drawings, in which:

Figure 1 is a side view of a container in accordance with a preferred embodiment of the present invention;

Figure 2 is a sectional side elevation of the preferred embodiment of container depicted in Figure 1;

Figure 3 is an exploded view of the components making up the preferred embodiment of container depicted in Figure 1;

Figure 4 is an exploded sectional view of the components of the preferred embodiment of container depicted in Figure 1;

Figure 5 is a sectional side elevation similar to Figure 2, but with the tear band removed in readiness for the inner bottle to be pushed into the outer bottle, and

Figure 6 is a sectional side elevation of the container after the inner bottle has been pushed into the outer bottle.

Referring now to the drawings, Figure 1 shows a

container in accordance with a preferred embodiment of the present invention. This figure illustrates the container in the form as it would appear to a consumer after purchase from a retail outlet. The visible parts comprise an outer bottle 10 which is preferably made from high density polyethylene, a sealing cap which is preferably made from polypropylene and a top cap 50 also formed in polypropylene. Top cap 50 also includes a frangible bead 54, the purpose of which will be explained in more detail below.

Between the upper visible portion of the outer bottle 10 and the lower periphery of the sealing cap 40, there is a tear band 43 having a finger grip portion or tab 44. Finger grip portion or tab 44 is grasped by the user and pulled away from the container to remove the tear band 43 from the container assembly and leave a gap G beneath the lower periphery of the sealing cap 40. The purpose of this gap G will be explained in more detail below.

Referring now to Figure 2, this shows a cross-section through the assembled container depicted in Figure 1. In this cross-sectional view, it is possible to see that the container also includes an inner bottle 20 and an annular collar 30. The inner bottle 20 is preferably made from high density polyethylene and the annular collar 30 is preferably made from natural low

density polyethylene.

In the region of the top cap 50, it is now possible to see that the top cap upper portion is formed as an applicator nozzle 53. Behind the frangible bead 54 there  
5 is provided a fluid passage 55.

A better understanding of the inter-relationship between the various components of the container can be obtained with reference to Figures 3 and 4 which show, respectively, an exploded view of the components making up the container and an exploded sectional view of these  
10 same components.

The outer bottle 10 is provided with a recessed base 15. This construction helps to brace the container and imparts additional rigidity to the bottom in the transitional region between the lower side walls of the outer bottle 10 and the base. This means that the container is able to be stored in an upright attitude  
15 without risk of collapse under its own weight.

At the upper end of its side wall, the outer bottle  
20 10 includes a transverse shoulder 14. As best seen with reference to Figure 2, the transverse shoulder 14 is abutted by the lower rim of the tear band 43. The upper rim of the tear band 43 is abutted by the lower periphery of downwardly-depending skirt 41 of the sealing cap 40.  
25 When the tear band is removed, a gap G is created between the lower periphery of the depending skirt 41 of the

sealing cap 40 and the transverse shoulder 14 of the outer bottle 10. The purpose of this gap G will be explained in more detail below.

Extending longitudinally above the transverse shoulder 14, the outer bottle 10 is provided with a neck portion 11 which defines outer bottle mouth 12. Neck 11 is provided on its radially outermost surface with an external screw thread. In the illustrated embodiment, this is a single start thread having a total circumferential extent of roughly 720°. It will be understood by persons skilled in the art that alternative forms of external screw thread could be used without materially affecting the performance of the present invention.

An annular collar 30 is receivable as an interference fit in the outer bottle mouth 12. The annular collar 30 includes an external flange 31 which is adapted to be seated on the upper rim of neck 11. Annular collar 30 defines an annular opening or mouth of the annular collar 32 and includes an axial portion 34 which extends from the external flange 31 to a lower periphery of the annular collar 30. At the lower periphery, the annular collar 30 is provided with an internal lip 33.

Inner bottle 20 is a gently tapering tube with a closed substantially hemispherical end 23 and an opening

or inner bottle mouth 22 at its upper end. Inner bottle 20 includes an external lip 21 at its upper extremity. Inner bottle 20 is adapted to be an interference fit within mouth of the annular collar 32 of the annular collar 30. As best seen with reference to Figure 2, the external lip 21 of the inner bottle 20 engages the internal lip 33 of the annular collar 30 to provide positive relative location means between the inner bottle 20 and the annular collar 30.

Sealing cap 40 includes a downwardly-dependant skirt 41. An upper portion of the radially inner surface of the downwardly-dependant skirt 41 is provided with an internal screw thread 42 which is complementary to the external screw thread 13 formed on the radially outer surface of neck 11 of the outer bottle 10.

Depending from the underside of sealing cap 40 is an annular plug seal 45. As best seen with reference to Figure 2, the axial length of annular plug seal 45 is such that it protrudes into the mouth 32 of the annular collar 30 and extends beyond the upper rim of neck 11 of the outer bottle 10. However, the annular plug seal 45 does not extend quite as far as the upper rim of the inner bottle 20. There is a gap 49 between the lower periphery of the annular plug seal 45 and the upper rim of the inner bottle 20. Annular plug seal 45 is adapted to be an interference fit in the mouth 32 of the annular

collar 30.

Sealing cap 40 includes an axially-extending upper neck portion 46 which defines a mouth 47 at its upper periphery. The radially outer surface of the upper neck portion 46 is provided with an external screw thread 48.

Top cap 50 includes a downwardly-depending skirt portion 51 having an internal screw thread formed on the radially inner surface thereof. Internal screw thread 52 is adapted to be complementary to the external screw thread 48 formed on the upper neck portion 46 of the sealing cap 40.

Top cap 50 further includes an upper tapering portion which serves as an applicator nozzle 53 leading to fluid passage 55 which is sealed by frangible bead 54.

Actuation of the container to effect mixing of the contents of the inner and outer bottles will now be described with reference to Figures 5 and 6.

Firstly, the tear band 43 is removed by grasping the finger grip portion or tab 44 and pulling in a direction away from the container assembly. When the tear band 43 has been removed, a gap G is created between the lower periphery of downwardly-depending skirt 41 of the sealing cap 40 and the transverse shoulder 14 of the outer bottle 10. Next, the sealing cap 40 is rotated clockwise relative to the outer bottle 10 to screw the sealing cap further onto the external screw thread 13 of the outer

bottle 10. This has the effect of closing the gap G that was created between the lower periphery of the downwardly-depending skirt 41 of the sealing cap 40 and the transverse shoulder 14 of the outer bottle 10.

5 As the clockwise rotation of the sealing cap 40 relative to the outer bottle 10 takes place, the gap 49 between the lower periphery of the annular plug seal 45 and the upper rim of the inner bottle 20 is eliminated and the annular plug seal 45 begins to push the inner bottle 20 downwards, out of engagement with the annular collar 30. When the outer lip 21 of the inner bottle 20 is pushed past the internal lip 33 of the annular collar 30, the inner bottle 20 drops into the volume defined by the outer bottle 10. This condition is  
10 represented in Figure 6. The contents of the inner bottle 20 can then be mixed with the contents of the outer bottle 10 by shaking the container.  
15

Seal integrity of the container is maintained because the annular plug seal 45 of the sealing cap 40 still forms an interference fit with the mouth 32 of the annular collar 30. Also, the annular collar 30 still forms an interference fit with the radially inner surface of the neck 11 of the outer bottle 10.

20 After the contents of the inner bottle 20 have been thoroughly mixed with the contents of the outer bottle 10 by shaking the container, the frangible bead 54 can be  
25

broken from the top of the top cap 50 to open the fluid passage 55. The mixed contents of the container can then be dispensed through applicator nozzle 53 via fluid passage 55. Best results for dispensing the mixed 5 contents of the container will be achieved by inverting the container and gently squeezing the outer bottle.

The sealing cap 40 and top cap 50 are provided as separable entities for two reasons. Firstly, removable top cap 50 enables the user to perform a skin test prior 10 to mixing the container contents and applying the mixture. Usually, in a two-component hair colourant preparation, the colourant material is provided in the inner bottle. In order to perform a skin test, the user simply unscrews top cap 50 and withdraws a small quantity 15 of the colourant material using a cotton bud or the like. The sample is applied to the user's wrist to ascertain whether there is likely to be an adverse skin reaction. The top cap 50 is replaced on the sealing cap 40, thereby enabling skin testing without compromising the sealing 20 integrity of outer bottle 10.

Secondly, this arrangement facilitates filling of the container in two stages. The outer bottle 10 is assembled with the annular collar 30 forming an interference fit in the bottle mouth 12. The desired 25 contents are then added to the outer bottle 10, which is subsequently sealed by inserting the inner bottle 20 into

the mouth 32 of the annular collar 30. Tear band 43 and sealing cap 40 are applied to provide a sealed sub-assembly awaiting delivery of inner bottle contents and final sealing by application of the top cap 50.

5        Although the invention has been particularly described with reference to a preferred embodiment, it will be understood by a person skilled in the art that modifications and variations are possible without departing from the scope of the claims which follow.

CLAIMS

1. A twin-chamber container comprising an outer bottle (10), an annular collar (30) receivable in the mouth (12) of said outer bottle (10) and being an interference fit therewith, an inner bottle (20) receivable in the mouth (32) of said annular collar (30) and being an interference fit therewith, and a sealing cap (40) operable between a fully sealed condition, in which it prevents escape of the contents of said outer and inner bottles, and a mixing condition, in which release of the contents from the outer and inner bottles is permitted; characterised in that said sealing cap (40) includes means (45) for releasing said inner bottle (20) from its interference fit in the mouth (32) of said annular collar (30) into the volume defined by said outer bottle (10) whilst maintaining fluid tightness of the container, thereby permitting the contents of said outer and inner bottles to be mixed prior to being dispensed.

20

2. A container as claimed in claim 1, wherein the outer bottle (10) includes external screw threads around the outside of a neck portion (11) thereof, and the sealing cap (40) includes complementary internal screw threads around the inner periphery of a skirt portion (41)

25

thereof.

5       3. A container as claimed in claim 1 or claim 2,  
          further including a tamper-evident band (43) adjacent the  
          lower periphery of the depending skirt portion (41) of  
          the sealing cap (40).

10      4. A container as claimed in any preceding claim,  
          wherein the means for releasing the inner bottle (20)  
          from its interference fit with the mouth (32) of the  
          annular collar (30) comprises an annular plug seal (45)  
          depending from the underside of the sealing cap (40).

15      5. A container as claimed in any preceding claim,  
          wherein the sealing cap (40) includes an applicator  
          nozzle (53) for delivering the contents of the container,  
          once mixed, to the intended site of application.

20      6. A container as claimed in any preceding claim,  
          wherein the sealing cap (40) includes a separate top cap  
          (50) attached to the sealing cap (40) by means of a  
          releasable connection.

25      7. A container as claimed in claim 6, wherein the  
          releasable connection comprises complementary screw

threads formed on a portion of the sealing cap (40) and a portion of the top cap (50), respectively.

8. A container as claimed in any preceding claim,  
5 including a frangible tip portion (54) adapted to be removed by manipulation to expose a fluid passage (55) which acts as a spout for dispensing the contents of the container, once mixed.

10 9. A container as claimed in claim 4, or any one of claims 5 to 8 when dependent on claim 4, wherein the annular collar (30) is adapted to be retained on the annular plug seal (45) when the sealing cap (40) is removed from the outer bottle (10).

15

10. A twin-chamber container substantially as described herein with reference to the drawings.

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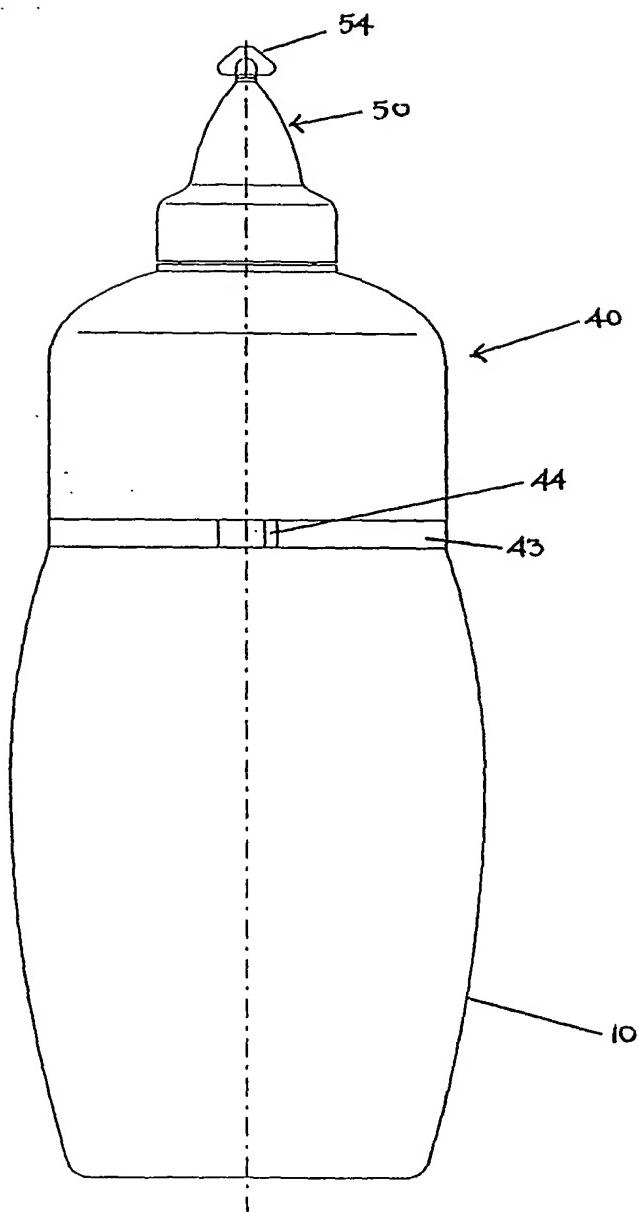


FIGURE 1

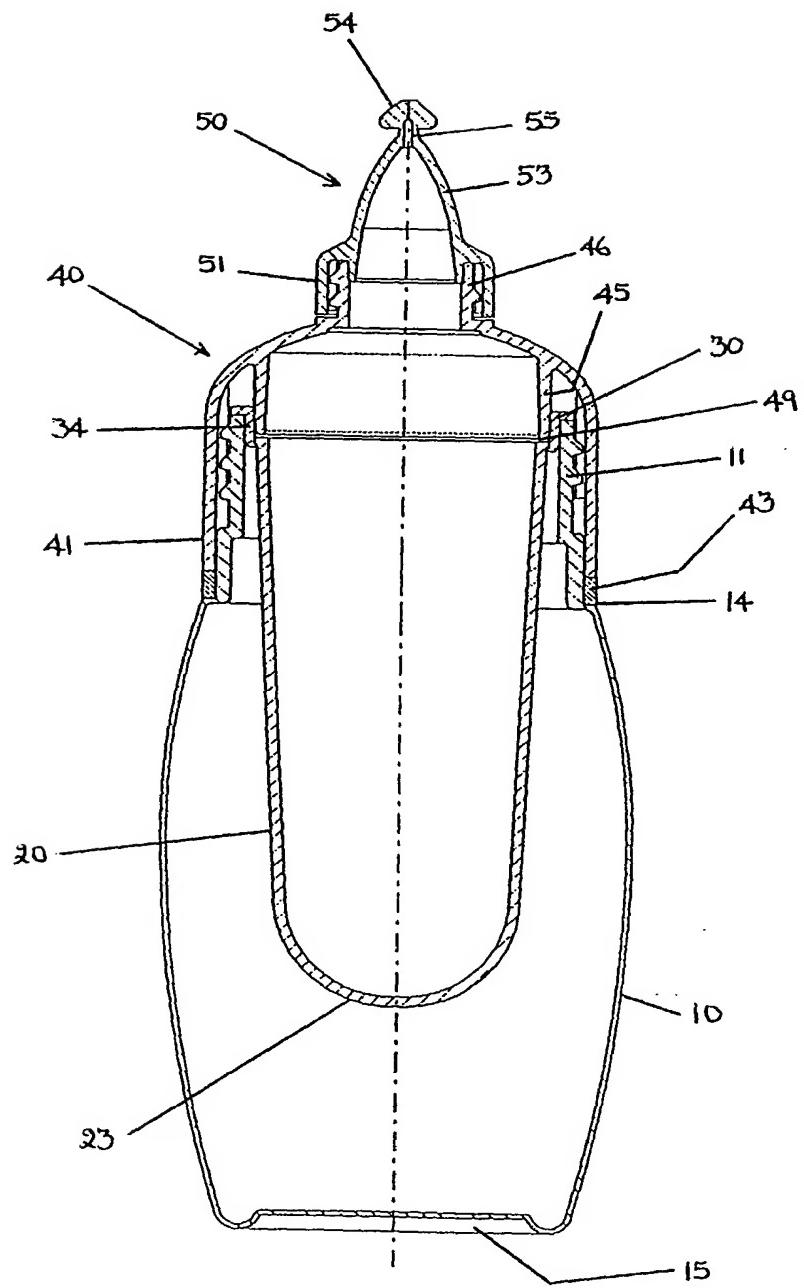


FIGURE 2

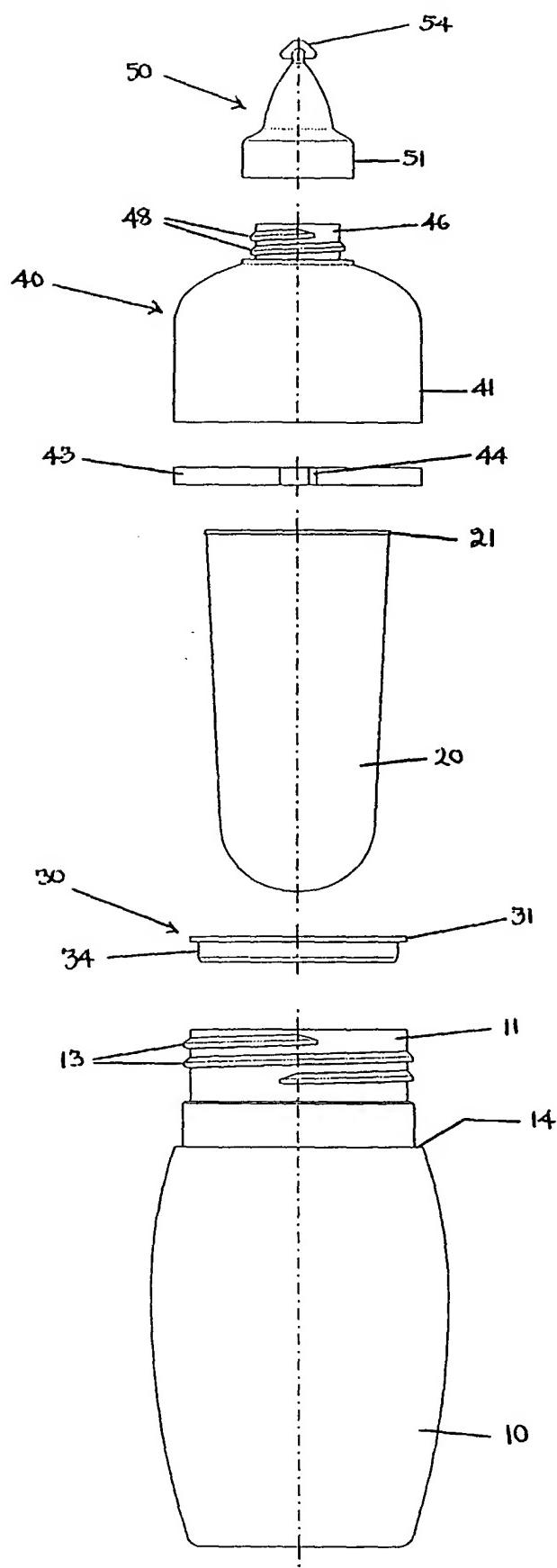


FIGURE 3

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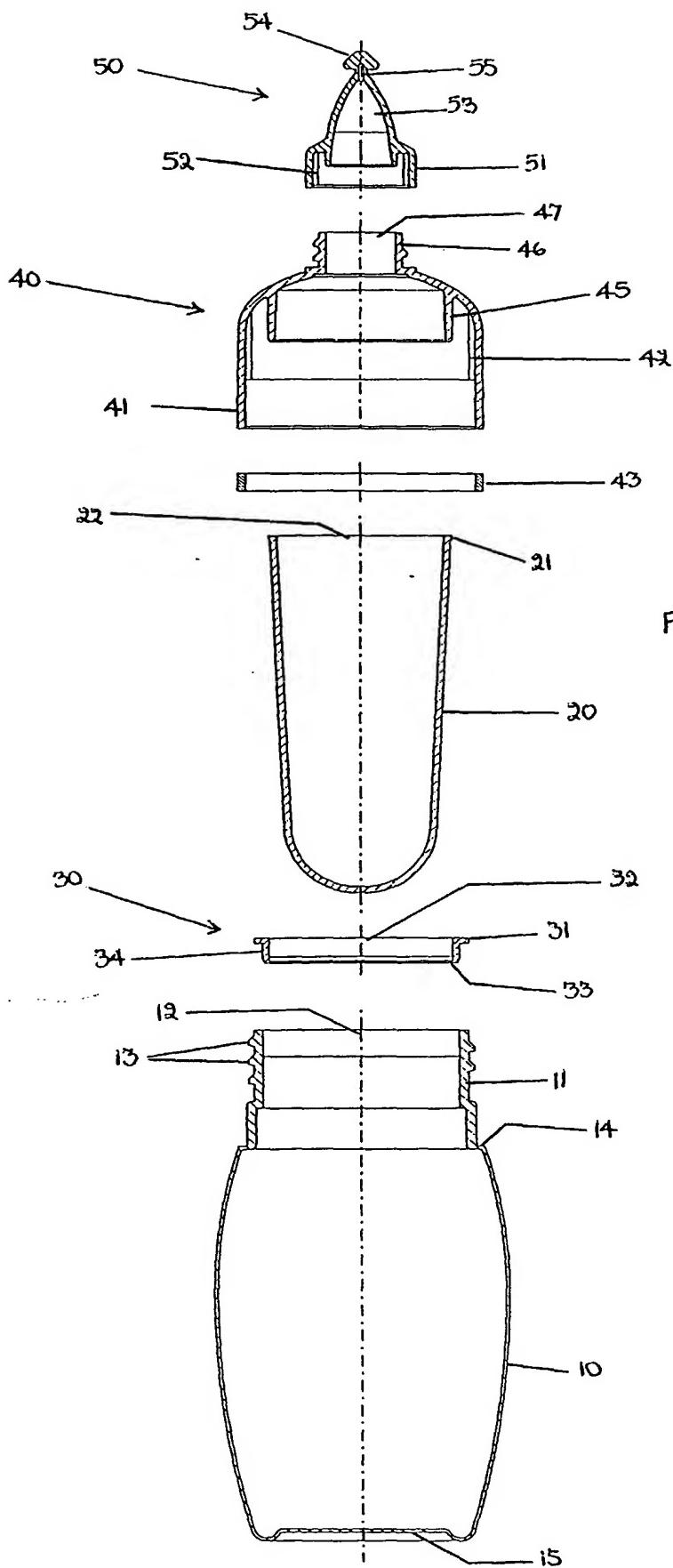


FIGURE 4

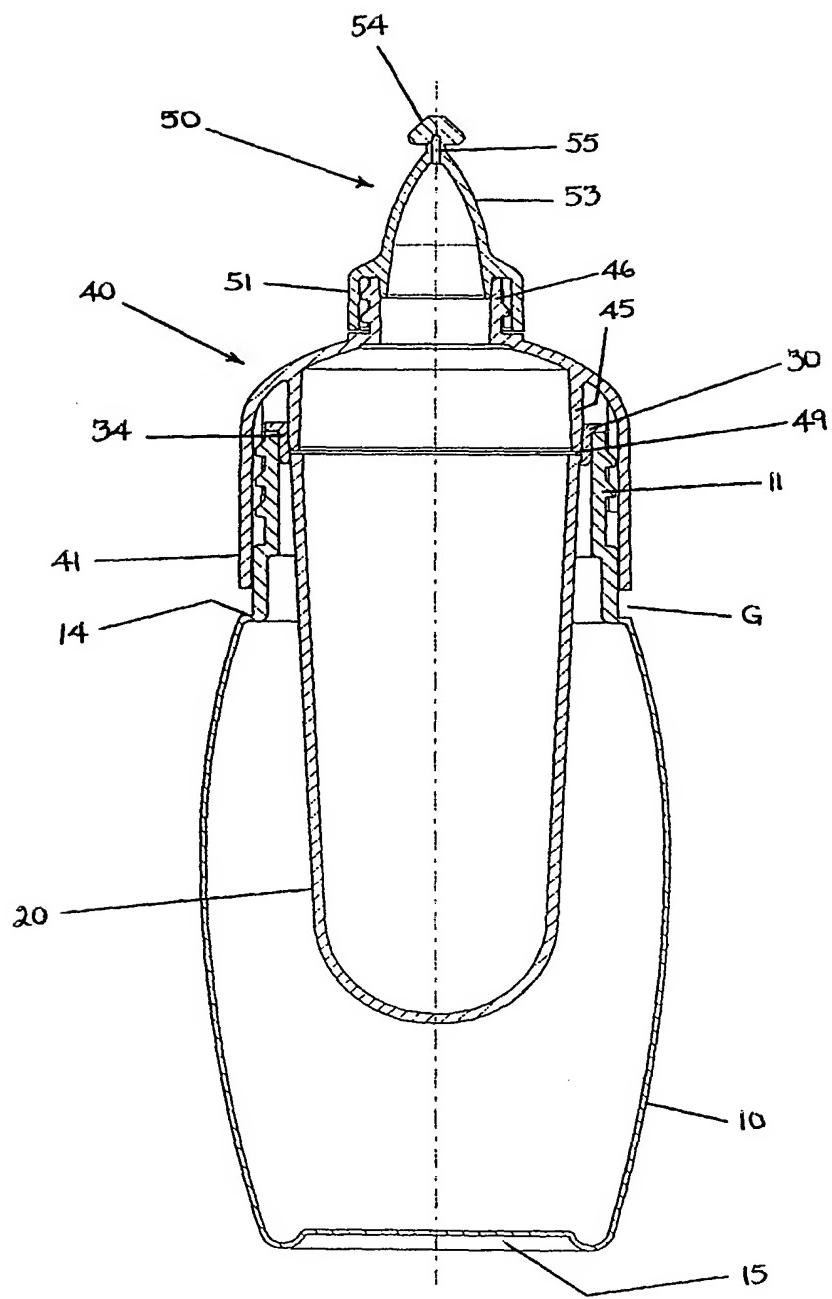


FIGURE 5

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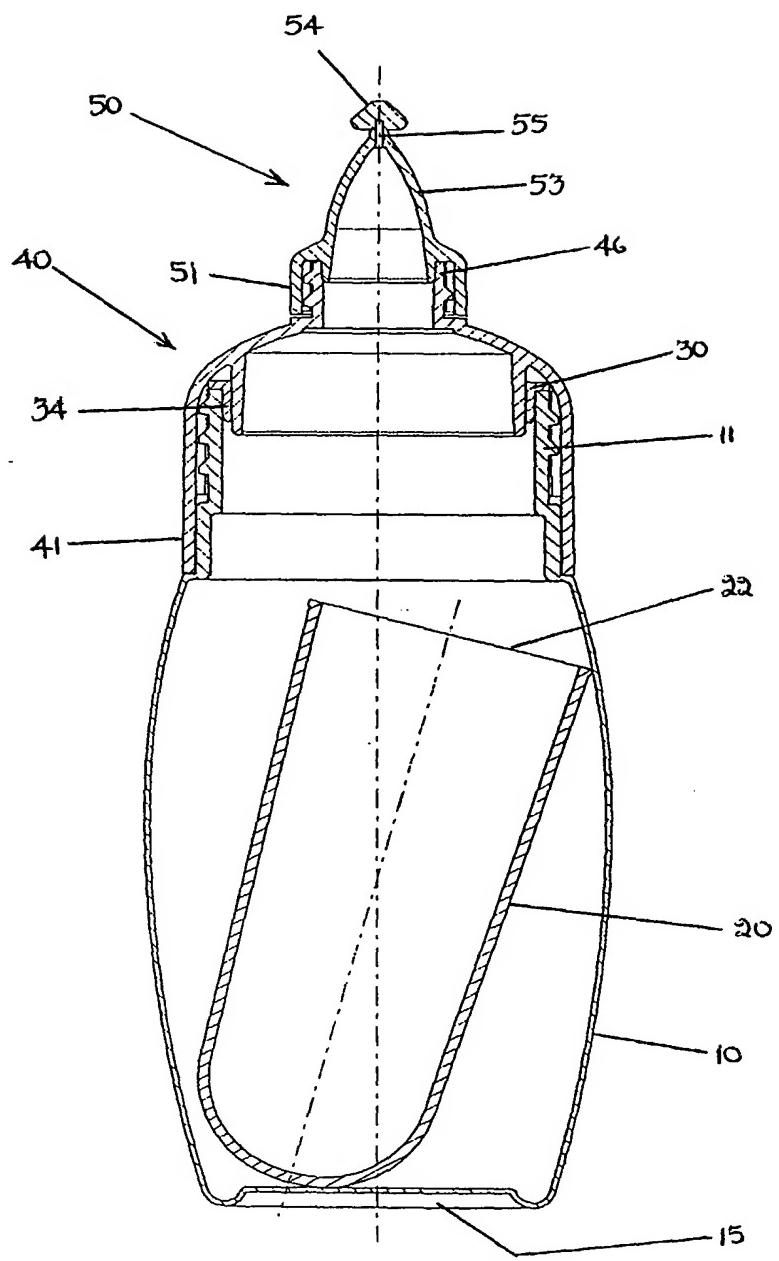


FIGURE 6

# INTERNATIONAL SEARCH REPORT

In tional Application No

Pl/GB 01/01688

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 B65D81/32 B65D51/28

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	WO 99 08943 A (COLLADO BONET JOSE) 25 February 1999 (1999-02-25) the whole document ----	1-9
Y	EP 0 943 552 A (WELLA AG) 22 September 1999 (1999-09-22) column 1, line 26 -column 1, line 56; figure 1 ----	6,7
A	EP 0 133 293 A (FINKE ROBERT KG) 20 February 1985 (1985-02-20) the whole document ----	1-9
		-/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
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Name and mailing address of the ISA  European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl. Fax: (+31-70) 340-3016	Authorized officer  Pernice, C

**INTERNATIONAL SEARCH REPORT**In tional Application No  
F01/GB 01/01688**C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2 974 785 A (HENRI GRIFFON) 14 March 1961 (1961-03-14) the whole document -----	1-9

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